

# **MIT**Sloan Management Review

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## Does IP Strategy Have to Cripple Open Innovation?

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How your IP strategy might be killing your open innovation activities — and what you can do to make it an enabler, even a builder of industrial ‘ecosystems,’ instead.

BY OLIVER ALEXY, PAOLA CRISCUOLO AND AMMON SALTER

THE PROTECTION OF intellectual property, or IP, would seem to be at odds with the pursuit of open innovation, or OI — companies’ use of “external ideas as well as internal ideas, and internal and external paths to market, as [they] look to advance their technology.”<sup>1</sup> The selective use of research carried out elsewhere can bring new ideas and capabilities to a company, render it more productive and profitable, prevent the company from having to reinvent the wheel and save it a good deal of money as well. While many companies struggle to align these two approaches, often finding that their IP strategy is a disabler of their OI efforts, this need not be the case. Companies that know how to use IP strategically<sup>2</sup> actually make it an enabler of their OI activities and an enhancer of those efforts’ returns.

## When an IP Policy Can Be Toxic

If your IP department is calling the shots about when and with whom you should cooperate, your OI strategy will be seriously limited. Many large companies essentially have a “no patent, no talk” policy: They will not collaborate with another

Many companies that invest heavily in research and development — such as Siemens, originator of this solar lamp for off-the-grid rural communities — have a reputation for patenting everything.



### THE LEADING QUESTION

How can companies make IP an enabler rather than a *disabler* of open innovation?

### FINDINGS

- ▶ Companies need to balance the use of open and proprietary innovation strategies.
- ▶ IP can generate licensing revenue while also fostering collaboration.
- ▶ Companies must drop the one-size-fits-all approach to IP.

### ABOUT THE RESEARCH

We based this study on a multiyear research project involving companies in various industrial sectors that actively practice open innovation, in which we approached numerous organizations, including IBM, Siemens, Arup, Nokia, P&G, 3M, Pfizer, QinetiQ and GlaxoSmithKline. Our data were derived from over 100 interviews. In addition, together with our research partners we conducted several workshops on the use of open innovation practices; these sessions were especially rich in discussions that centered on conflicts between OI and intellectual property. We also used both publicly available and privately collected data, at the level of the company and individual, to study OI, its relation to IP and its effect on company performance.<sup>1</sup>

party if it does not at least have a patent application in place. While this approach may prevent them from being accused of stealing technology, it also means they miss out on a range of potentially valuable external ideas that are as yet unpatented, or unpatentable altogether. Such a “one-size-fits-all” approach to IP is generally unhelpful to OI. (See “When IP Disables, or Enables, Open Innovation.”)

Large companies are not alone in this potentially misguided policy. Increasingly, universities around the world are insisting on their own IP terms prior to working with industry. Such approaches present a major barrier to collaboration with some of the brightest minds, choking off a critical input to OI. For example, Rolls Royce plc finds that it takes 18 months to negotiate a research collaboration agreement with a university partner; having routinely experienced such delays, the company is considering whether to terminate its extensive network of university research centers altogether.

Similarly, many companies heavily active in research and development have a reputation for patenting everything created in their research labs. This process entails huge cost — and huge waste. Siemens Aktiengesellschaft and the Procter & Gamble Co., for example, recently reported that they use a mere 10% of their patents but nevertheless pay millions in annual renewal fees for the remaining 90%. In addition, all the IP they have generated can create patent thickets that inhibit potential collaborators.

Detrimental effects on OI occur when IP is transformed from a means of capturing the value of innovation to an end in itself. Sure, any company would be happy to find a “Rembrandt in the attic,” but many forget that in order to make money from it, they will also need to identify licensees.<sup>3</sup> For a few companies, such as Qualcomm, Philips Electronics and Thompson, this strategy may work successfully. According to Acacia Research Corp.,<sup>4</sup> these companies generate from \$500 million to \$2 billion per year in patent licensing. But the majority of companies have only moderately succeeded, if at all, in making money through licensing or selling their IP. Indeed, 99% of patent-licensing revenue in the United States is generated by companies that own 40% of all U.S. patents; that is, the remaining 60% of the patent holders receive just 1% of the revenue.

Moreover, the monetary reward from patent licensing can be a misleading measure. By insisting that IP may only leave a company if it is paid for, that company eliminates the possibilities of cooperating with others on those technologies and benefiting from related or second-generation innovations they may create. Among the interviews we conducted, one company in particular did not even allow employees to leave the corporate facilities for business matters elsewhere unless they passed a highly selective IP test. This policy may have been protective in the short run, but imagine all the interesting conversations and fruitful possibilities the company might have been missing out on.

### How IP Can Boost Your OI Strategy

Generally, too much focus on IP will scare away the very people with whom interacting could provide the most benefit. We call this phenomenon the “Medusa Effect” of IP — through excessive patenting, overly stringent IP policies or the prohibiting of communication between company researchers and those outside, potentially productive collaborators will look elsewhere. As far as your company is concerned, they will essentially have been turned into stone! And your company’s record as an innovator will be all the poorer.

By contrast, consider the increasing number of companies, such as International Business Machines Corp., that are involved in interconnected “ecosystems” — critically dependent on cooperating with other parties to generate innovations and profits. Until a few years ago, IBM would attempt to negotiate IP agreements with collaborators prior to commencing a project, a process that consumed both time and money. Finally, during a meeting of senior staff, CEO Sam Palmisano questioned the value of this process by asking if any partner of IBM had ever actually sued for IP infringement. Observing that no one could recall such a case, he instituted a new light-touch agreement to share IP (either through joint ownership or automatic licensing) arising from such projects — typically, with clients. IBM also ensured that they could not stop it from reusing IP with its other clients, thereby preserving its ability to transfer lessons from one project to another.

IP is not always bad for OI. To the contrary, there are many situations in which IP is a facilitator of

collaborative research and development activities. Take P&G's Connect + Develop process, in which the company actively searches for other parties' IP to put into its own product pipeline. If IP rights, such as patents, are in place, they become the currency of innovation; when P&G finds an idea that it wants to turn into a product, its transfer to P&G is much easier if the underlying technology is protected by a patent. First, P&G is better able to understand what the idea is about and how it works, as that information is reported in the patent. Second, inventors need not fear that P&G will misappropriate their idea, because the patent proves it is theirs. Finally, the existence of the patent enables the easy transfer of ownership rights; P&G can simply license or buy the patent.

IBM, for its part, actively uses its own large patent portfolio to encourage OI in its ecosystem. For example, in 2005, IBM made 500 valuable patents available to the open-source software community, which could now use them for free. IBM hoped to stimulate a flow of innovation to its ecosystem, thereby boosting its total value. Among other things, this move has allowed IBM to considerably lower customers' fears about patent-infringement issues with the Linux operating system. Linux is a vital part of many of IBM's product offerings — if customers had fears about IP issues with it, sales could suffer.

Generally, intellectual property is beneficial to OI when it is used more as a signaling device than as a control right. For example, having a patent provides the entrepreneur with an improved basis for negotiations with venture capitalists, potential collaborators or large companies interested in buying the idea. From the perspective of a company, the patent shows third parties that the company has made an inventive step in a particular area, perhaps indicating an associated expertise. This recognition may help to attract partners that are active in similar areas.

Critical to such outcomes is the development of a well-tuned internal system to ensure that the company's IP can be fully managed and leveraged. One company that has created such a system is Nokia Corp. All internal inventions are reported to the IP rights department, where they are screened for commercial and technical viability; only those ideas of high enough quality are transformed into patent applications. This process has at least two

## WHEN IP DISABLES, OR ENABLES, OPEN INNOVATION

Companies that know how to play the IP game can use it, with considerable success, to foster and facilitate their open innovation strategy.

IP DISABLES OPEN INNOVATION WHEN:	IP ENABLES OPEN INNOVATION WHEN:
One-size-fits-all approaches, such as "no patents no talk," predominate	IP management is adaptable
IP and OI strategies are disconnected	IP and OI strategies are integrated
Lawyers are a roadblock to OI, dictating the who, when and how	Lawyers help pave the way for cooperation
There is a "patent everything" outlook	Smart patenting — which involves only valuable inventions — prevails
IP is treated as an end in itself	IP is seen as an opportunity for value creation and the building of ecosystems
IP builds fences through the hoarding of patents and excessive secrecy	IP is available to others and, through licensing and cooperation, is likely to be profitable

major advantages for Nokia. For one thing, the company bears the expenses associated with patenting (such as writing, filing and examination) for just those patents that it actually needs. For another, the preselection process implies that it does not invest money in patents only to see them rejected by the government's patent office; Nokia, in fact, has an extremely high acceptance rate.

## How Smart Companies Use IP Wisely

So how can your company use IP to support a successful OI strategy? The enabling function of IP depends on the specific circumstances under which companies engage in OI. In our study (see "About the Research"), two variables in particular have emerged as critical determinants: the *technological environment* in which the company is active, and the *knowledge distribution* among potential collaborators.

For ease of discussion, we present each variable as having two possible values. The technological environment, for instance, is either *calm* or *turbulent*. In calm environments, technology evolves slowly, problems are clearly defined and potential solutions are straightforwardly found and applied. Further, the company itself is moving in steady waters — for example, in a slow-growing market — and no major upheavals in market structure are expected, whether from new entrants or from changes in the dominant technological

paradigms. Opposite characteristics apply to turbulent environments: There is great technological uncertainty, and a wide variety of ideas may be competing to solve yet-to-be-clearly-defined commercial applications. Commercial viability may only be on the horizon, but once it happens, it has the potential to fundamentally change the face and structure of the market.

Concerning the nature of innovative knowledge distribution, we think of external knowledge as residing either with the few (i.e., in *puddles*) or with the many (in *oceans*). When oceans of knowledge

most strongly resembles traditional “closed” models of innovation, in which the IP strategy is to protect knowledge in order for companies to appropriate value. Cooperation with other companies usually has short-term and clearly measurable targets and, often, predictable outcomes. In situations such as these, companies may search the “market for technologies” to license or acquire technologies for their specific needs.<sup>5</sup> Because IP rights, often in the form of patents, are used to facilitate this process, IP becomes the currency of open innovation.

Companies that wish to fill their product pipelines by accessing external ideas often use this strategy, leveraging the ideas through their own complementary assets. P&G, whose Connect + Develop process is a prime example, tries to identify valuable external ideas and products close to markets in which its product and brand portfolio play active roles. P&G subsequently acquires or licenses the related IP and leverages it by means of the company’s vast manufacturing and distribution capabilities. Alternatively, P&G may be willing to license out its own technology for financial profit, as illustrated in the case of its plastic-film technology. (See “P&G and Glad.”)

Because it is often necessary to reach out to others to find applications for one’s own IP, P&G has essentially established a “use it or lose it” policy. For example, every technology developed in-house will be considered by the licensing department either after it has first been used in a P&G product or five years after the patent covering that technology has been granted, whichever comes first.<sup>6</sup> If a patent cannot be licensed, it will not be renewed, thereby saving maintenance costs and helping to foster collaborative innovation.

**Turbulent Oceans, or “If You Give It Away, They Will Come”** The “turbulent ocean”—a chaotic milieu with many potential sources of knowledge—represents the exact opposite of the calm puddle. Thus it is not surprising to find that companies making the smartest use of IP under such circumstances are the ones turning the logic behind IP rights, such as patents, upside down. Rather than use them to prevent others from exploiting certain technologies, companies such as IBM and Nokia have granted free access to large portions of their IP bases.

**IP STRATEGIES IN DIFFERENT OPEN-INNOVATION ENVIRONMENTS**

The two critical determinants of a company’s most appropriate IP/OI strategy are its technological environment (which can be either calm or turbulent) and the knowledge distribution (either extensive—in “oceans”—or modest, in “puddles”) among would-be partners. Thus, for the purposes of this article’s analysis, there are four possible circumstances facing the company.



exist, companies can find a wide array of potential external partners, many of which may be easily accessible. With puddles of knowledge, on the other hand, only a few parties have the capacity to work with the company on innovative solutions to current problems, which puts a tight limit on the number of potential cooperation partners.

By combining these two dimension sets, and thus creating four possible scenarios, we can provide a better sense of a company’s most appropriate IP/OI strategy. Depending on the category into which the company falls, IP plays a different role as an enabler of OI. (See “IP Strategies in Different Open-Innovation Environments.”)

**Calm Puddles, or “Sign It, Seal It and Get It Delivered”** The strategy in the “calm puddles” quadrant

Even much smaller companies, such as Stockholm, Sweden-based Propellerhead Software, have benefited tremendously from opening up aspects of their products to the public. When Propellerhead launched its synthesizer-emulator software ReBirth in 1997, it soon discovered that the product had been hacked. Users wanted to do things with the software that were very different from Propellerhead's original objectives. The company then had to decide whether to shut down the hackers by invoking copyright or change its business model to a more open architecture that could accommodate user modifications. Its decision to do the latter has resulted in tremendous success, as it now has an active community of over 4,000 users who participate in its online forum each year. These users have solved problems, generated content and produced more than 150 product modifications. Such modifications have increased the life span of different generations of Propellerhead's software and expanded the products' features and functionality in unanticipated ways. And by excluding users with hacked versions of the software from receiving help and support, the online community has been instrumental in helping the company to police the use of its products.<sup>7</sup>

In other words, smart companies in turbulent oceans open up their IP to third parties in order to attract them to their ecosystems. Such parties, who might join the ecosystem to use the open technology as a basis for their own products and services, will in so doing also increase the total value of the ecosystem for the original company.

Companies can implement this turbulent oceans strategy in two ways. On the one hand, they may give away a core technology and profit from the growth of ecosystems through complementary products and services. IBM pursued this strategy in 2001 by releasing to the public the source code of its Eclipse project, a developer tool worth some \$40 million at that time. Through that action the company was trying to replace other software-development products, such as the ones supplied by Microsoft Corp. and Sun Microsystems Inc., with a standard framework into which IBM might better integrate its Rational software product line. Eclipse is now one of the world's most widely used software development

tools, actively supported by almost all of the major players in the software industry.

On the other hand, companies might keep the core of their technology proprietary but freely give away extensions, design specifications and other tools that facilitate third-party involvement. ARM Holdings plc, headquartered in Cambridge, United Kingdom, designs and licenses microprocessors used in wireless devices and is a prime example of such an approach. By purposely releasing part of its software and system IP to existing and potential clients, it has created an ecosystem of users and suppliers that has secured it a dominant market position.

In both cases, giving away IP has helped to kick off and sustain ecosystem growth. Proactively pledging the open IP to the ecosystem (in effect, transferring the patent ownership to it), as opposed to just allowing access by others, may even intensify this effect. That is, the ecosystem would have its own IP base to potentially defend itself against attackers.

**Calm Oceans, or "Spread the Problem, Secure the Solution"** IP becomes a particularly tricky issue in "calm oceans," where technology environments are stable and knowledge is widely dispersed among many players. Here, companies engage in OI to find solutions through the wisdom of crowds, distributing a problem to a broad audience. Depending on

## P&G AND GLAD

These two companies, one holding the IP rights to a particular technology and the other a leader in the relevant market, were able to establish a mutually beneficial joint venture involving one specific line of products.

The plastic wrap now known as Glad Press'n Seal started as an innovation that was developed and successfully test-marketed by P&G. But the clear segment leader at the time was the Clorox Co., which would have been difficult to dislodge. After Clorox approached P&G, the companies set up a joint venture under Clorox's Glad brand. P&G brought to the partnership the IP behind Press'n Seal and future related innovations, as well as its global marketing and distribution network. Overall, the joint enterprise has been hugely successful. Total Glad sales, for example, have doubled in the four years since the venture was formed. Moreover, the venture, which allows P&G and Clorox to continue to collaborate on other initiatives in the plastic-film business, shows that competitors can work together closely on one particular line of products while protecting the integrity of both parent companies.<sup>ii</sup>



the company's needs for its innovation process, the result will be either a consensus solution or a small set of handpicked individuals' solutions.

The larger the company's market and the less specific the knowledge, the larger the universe of potential solvers — and the more difficult the exploitation of their ideas. To be able to benefit from suggested solutions in such an environment, the company needs to be able to attain full IP ownership. Take, for example, Dell Inc.'s IdeaStorm, launched in 2007 “to gauge which ideas are most important and most relevant” to the computer company's customers. When a user submits an idea on how to improve Dell's products and services, he or she grants the company a perpetual, irrevocable and royalty-free license to use it.

Another example comes from Minneapolis, Minnesota-based Coloplast Corp., manufacturer of products and services for ostomy care, urology and continence care, and wound and skin care. To complement in-house R&D, Coloplast reaches outside — as in its user forums for specific products — to find new ideas for improving the ergonomics, comfort and performance of existing products and for developing new products. Users are often eager to participate, as they will be the first to benefit from such improvements. To enable company control over the IP arising from these forums, Coloplast requires that ownership of all ideas discussed be automatically transferred to the company.

**Turbulent Puddles, or “For Many Eggs, Get Many Baskets”** “Turbulent puddles” are environments in which knowledge resides only with a few actors — such as R&D-intensive companies, laboratories and top universities — and the future is highly uncertain, research is very costly and predictions about changes in market structures and new technologies are often mere guesswork.

In such situations, companies usually try to partner with others they consider experts in the area in order to decrease costs, increase chances of developing successful innovations and get a better sense of future technologies. In lieu of focusing on their own individual patents, companies design clear rules for establishing how IP generated jointly will be treated. These rules are particularly important in determining the scope of the joint efforts (for example, which

IP is jointly owned by all companies, which IP solely belongs to a particular company) and how companies should handle ownership of the generated IP (copatenting, licensing or exclusive ownership).

When companies in turbulent puddles opt for OI strategies, they do so in two primary ways. First, they may form “research clubs” — collaborative agreements or consortia — with other companies active in the industry or knowledgeable about the technology involved. By joining forces to do pre-competitive research, companies hope to reduce technological uncertainty upstream and establish platforms and dominant designs. Downstream, however, the former allies will turn into fierce competitors, each of which will try to profit from its own extensions of the platforms.

This model is increasingly applied in the pharmaceutical sector to spread the costs and risks of drug development areas across a pool of partners. Take, for example, the Structural Genomics Consortium, a public-private partnership of Stockholm's Karolinska Institutet, the University of Oxford and the University of Toronto. Funded by Merck, Novartis, GlaxoSmithKline and nine other organizations and foundations, the SGC was created in 2004 to identify the structure of proteins and to release this information into the public domain without use restrictions.

For pharmaceutical companies in this research club, there are no returns to be made in terms of IP, as they do not get exclusive rights to the consortium's results. However, they do get the opportunity to steer its research agenda by nominating proteins important for their potential product portfolios. Supporting companies can therefore expect to have a first-mover advantage with respect to competitors that are not part of the consortium.

Second, companies may try to run “open research programs.” Similar to venture capital funds but with very long-term outlooks, such programs selectively invest in external research projects, hoping they will contribute substantially to realizing the company's objectives. The investment is usually tied to a collaboration framework under which the company has the option to purchase or license all IP generated in individual research projects. For example, Hewlett-Packard Co. has open calls that encourage university researchers to submit research

proposals on specific challenges; HP guarantees the researchers freedom to publish, but it gets nonexclusive rights to IP arising from the projects.

Companies excelling at this model have evolved from venture-capital-like large upfront investments to milestone-driven external research projects. This approach is exemplified by GlaxoSmithKline's Center of Excellence for External Drug Discovery, which sets up collaborations with biotech companies that are responsible for carrying out research up to a certain point of the drug-discovery process. GSK will only pay the biotech company if it achieves predetermined milestones, and GSK will have the exclusive option to license the drug. To help assure the biotech company's progress toward its research goals, GSK provides advice during the early stages on issues such as dealing with regulators, making decisions on trial design or carrying out commercial analyses. The bottom line is that by following this model, the CEEDD can run a pipeline of drugs the size of which rivals the number of similar in-house projects at GSK, but at much lower organizational cost.

## Toward an Exquisite Balance

The IP landscape is currently transforming, consistent with the shift toward a knowledge-based economy. To prosper in this new environment, companies need to find a balance between closed innovation programs (intended to produce revenue and profit for the IP owner alone) and the creation, maintenance and enhancement of capabilities that can be shared — even free of charge — through open programs.

To make this model a reality, managers need to make IP an enabler rather than a disabler of OI efforts. This often means dropping the “one-size-fits-all” approach to IP and adopting instead a case-by-case approach; otherwise, potentially rich and productive external engagements could be lost. In that way, IP can be used as a vehicle for building and sustaining ecosystems and communities rather than as a knee-jerk defense tool against all outsiders. The implementation of such a business-led IP strategy also translates into smart IP policies and processes — for example, patenting only the most valuable inventions, licensing rights to other companies to use certain patents or giving away those patents entirely. Finally, companies should adopt a holistic approach to IP, taking into account both its virtues and threats and educating their

employees about just how IP should fit into the organization's overall value-capture strategy.

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